2014 Water Quality Assessment Submittal to EPA
4b Analysis for Asotin Creek Watershed
September 2015

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude 17 temperature listings from the 303(d) list and place these water bodies in category 4b of the IR. The specific listings are:

WATERBODY	PARAMETER	CATEGORY	LISTING ID
ASOTIN CREEK	TEMPERATURE	5	13851
ASOTIN CREEK	TEMPERATURE	5	13852
ASOTIN CREEK	TEMPERATURE	5	13854
ASOTIN CREEK	TEMPERATURE	5	13860
ASOTIN CREEK	TEMPERATURE	5	13863
ASOTIN CREEK, NF	TEMPERATURE	5	13985
ASOTIN CREEK, NF	TEMPERATURE	5	13986
ASOTIN CREEK, NF	TEMPERATURE	5	22425
ASOTIN CREEK SF	TEMPERATURE	5	13858
ASOTIN CREEK, SF	TEMPERATURE	5	22426
CHARLEY CREEK	TEMPERATURE	5	13862
CHARLEY CREEK	TEMPERATURE	5	22427
GEORGE CREEK	TEMPERATURE	5	20352
GEORGE CREEK	TEMPERATURE	5	22429
GEORGE CREEK	TEMPERATURE	5	29321
LICK CREEK	TEMPERATURE	5	22430
PINTLER CREEK	TEMPERATURE	5	20354

Ecology's basis for excluding these water bodies from the 303(d) list is outlined in this analysis.

Identification of Segment and Statement of Problem Causing Impairment

The Asotin Creek watershed is located in the southeast corner of Washington State. The majority of the watershed occurs within Asotin County. Some headwater streams get their start in Garfield County. Asotin Creek drains approximately 208,000 acres. The creek originates in the mixed conifer forests of the Blue Mountains. It cuts through layers of basalt rock and flows through narrow canyons before empting into the Snake River at the town of Asotin, Washington.

The name "Asotin" is derived from the Nez Perce word, Heesut'iin, "Eel Creek" (Hitchman 1985). The Asotin Creek watershed was the center of a fishing village for

collecting Pacific lamprey (*Entosphenus tridentatus*), now rarely found in the creek. The watershed is still home to threatened species of fish including Snake River Steelhead as well as Bull Trout and Spring Chinook Salmon.

Asotin Creek has several tributaries, the largest is George Creek. Asotin creek is divided between the North and South Forks in the upper watershed. Other tributaries include Charley Creek, and Lick Creek. The George Creek watershed is approximately 89,000 acres and its major tributaries include Pintler Creek, Kelly Creek, and Rockpile Creek.

The geology of Asotin Creek region is of interest given it results in specific land-use patterns. The watershed consists of layers of basaltic rocks, formed by multiple ancient lava flows. The bedrock has been covered by fine-grained soils that are highly erodible. Folding of the underlying bedrock has resulted in a plateau increased in elevation and tilted to the north and east. The uplifting of the bedrock has caused streams to cut down and form steep and narrow v-shaped canyons.

The Asotin Creek watershed climate varies dramatically between the upper and lower portions of the watershed. Rainfall ranges from more than 45 inches in the higher elevations of the Blue Mountains to 12 inches near the confluence with the Snake River. This substantial variation occurs over approximately 20 miles, a relatively short distance. Ninety percent of the precipitation occurs between September and May with thirty percent of the winter's precipitation falling as snow. Snowfall at elevations less than 1,500 feet seldom lingers beyond three or four weeks, occasionally melting quickly enough to produce severe erosion.

Because of the differences in precipitation and elevation, vegetation also varies greatly in the watershed. Upland vegetation is dominated by mixed conifer forests in the upper watershed. The arid region near the Snake River is a shrub-steppe ecosystem dominated by sage and bunch grass. The stream corridor vegetation occurs in varying successional stages and consists mainly of alder and black cottonwood stands with mixed understory of shrubs. Ponderosa Pine is a dominant evergreen in much of the watershed. In the lower watershed, it typically occurs only in the transition zone between the riparian and upland areas. In the forested areas of the Blue Mountains, it is found throughout the uplands.

Multiple planning efforts have been completed in the Asotin Creek watershed. Most of these have been focused on salmon and steelhead recovery. The plans that have resulted all recognize stream temperature as a critical component of salmonid habitat and identify specific actions necessary to address temperature problems in the watershed. The Asotin Creek Model Watershed Plan proposed three implementation strategies to address the temperature problem:

- Streambank & Shoreline Protection
- Stream Channel Vegetation
- Fencing (Riparian)

The Bonneville Power Administration Sub-basin Plan's strategies included management practices such as:

- Installing riparian buffers including livestock exclusion and planting
- Upholding existing land-use regulations
- Implementing conservation easements
- Decommissioning/paving roads

The Snake River Salmon Recovery plan identified riparian buffers and planting as primary tools to address temperature problems. The Middle Snake (WRIA 35) Watershed Plan identified stream temperature as a water quality problem and revegetation of stream corridors as a strategy to address it.

Much of the riparian vegetation in the Asotin Creek watershed is healthy compared to many eastern Washington watersheds. This is due to the rural location of the stream, the canyon geography that has prevented crop production along its banks, the public ownership of a significant portion of riparian area, and the extensive work by landowners to improve the riparian condition over the last several years.

However, there are five primary land-uses that cause nonpoint pollution and temperature problems in the Asotin watershed. Ecology's land use evaluation of the watershed has resulted in ranking the impacts causing the violations of temperature standards.

1) Livestock Feeding
2) Livestock Grazing
3) Urbanization
4) Forestry
5) Crop Production

Livestock Feeding—Winter feeding is a major source of impacts to riparian areas and vegetation on private lands. While many of the feeding areas have been fenced from surface water, much of that fence is too close to the creek to adequately protect surface water. Winter feeding areas continue to damage woody vegetation and prevent sapling recruitment and regeneration.

Livestock Grazing—Grazing activities also impact riparian vegetation, particularly in the upper portions of the watershed. Areas along the streams not ideal for winter feeding are often grazed from spring to fall. This includes some of the private forested areas.

Urbanization—Areas near Asotin are also likely contribute to temperature problems in the creek. Although the area is relatively small compared to the other land uses, the impacts to riparian vegetation are significant. Some homeowners have removed trees and shrubs and have lawns or pasture down to the water's edge. There are properties that own horses on small lots which access surface water and damage riparian vegetation. The city park and the Asotin Elementary school sports fields lack sufficient riparian vegetation.

Forestry—Historic timber harvesting on both public and private lands has removed many of the trees from the riparian zone. This has been particularly true on the Forest Service managed lands. Much of the shade in the upper watershed was lost due to historic logging activities. But, in recent years little logging has occurred in the riparian areas of

the watershed. There has also been significant natural vegetation recovery and planting within the Umatilla National Forest.

Crop Production—Only a small portion of the riparian areas in the Asotin watershed are impacted by wheat and barley production. Most areas impacted by crop production occur in the upper Pintler Creek watershed where the streams are intermittent or ephemeral. In those areas, it is common for farming to occur up to streambanks or even through the stream channel.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

Water quality target

In the Asotin Creek watershed, the water quality standards designate the following aquatic life beneficial uses:

Char spawning and rearing: This use protects spawning or early juvenile rearing by native char, or use by other species similarly dependent on such cold water. This use also protects summer foraging and migration of native char; and spawning, rearing, and migration by other salmonid species.

Core summer salmonid habitat: This use protects summer season, defined as June 15 through September 15, salmonid spawning or emergence, or adult holding; summer rearing habitat by one or more salmonids; or foraging by adult and sub-adult native char. Other protected uses include spawning outside of the summer season, rearing, and migration by salmonids.

Salmonid spawning, rearing, and migration: This use protects salmon or trout spawning and emergence that only occur outside of the summer season (September 16 – June 14). Other uses include rearing and migration by salmonids.

Use designations for water bodies in the Asotin Creek watershed

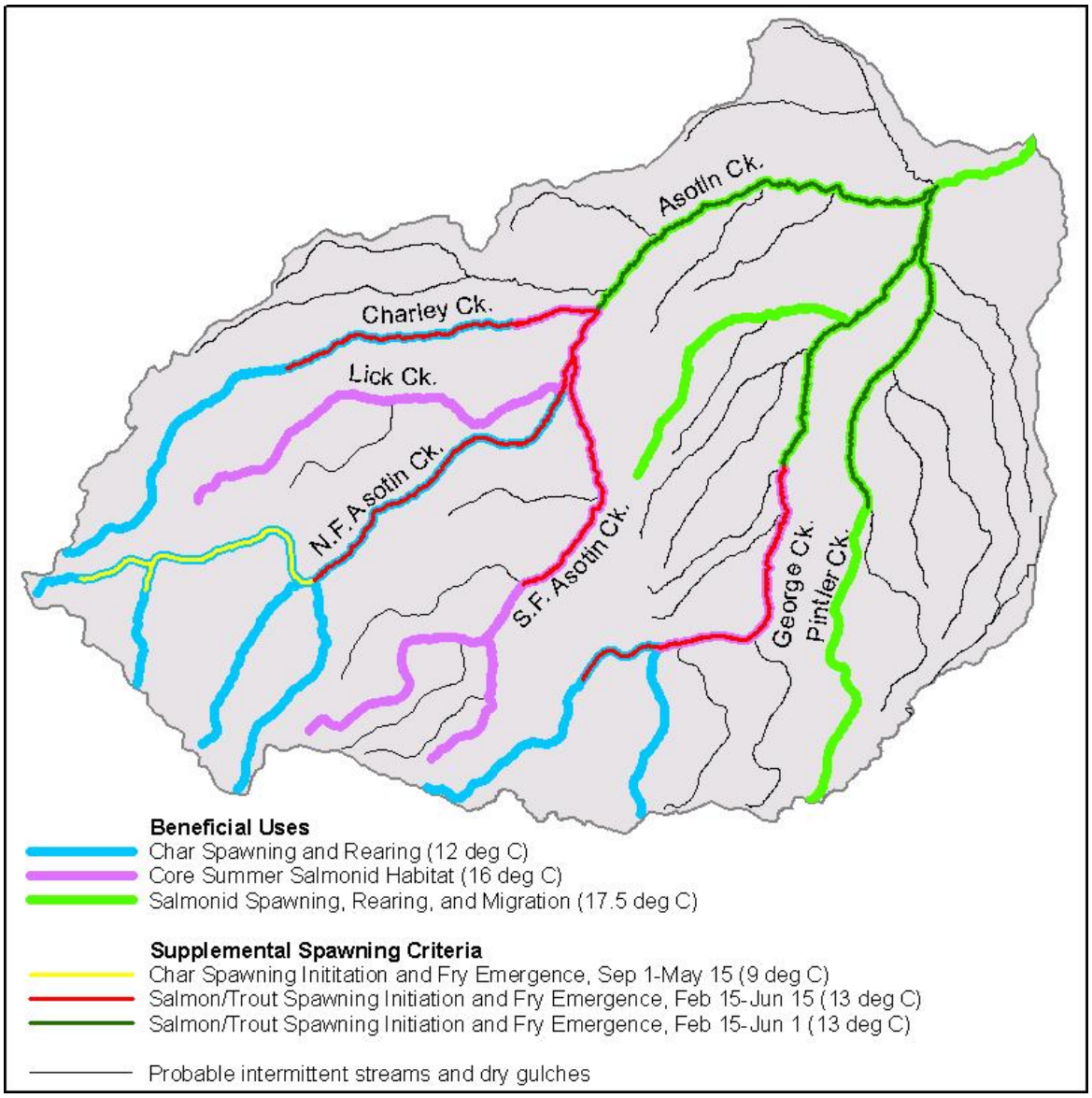
Water Body	Aquatic Life Uses		
	Char spawning and rearing	Core summer salmonid habitat	Salmonid spawning, rearing, and migration
Asotin River from and including Charley Creek to headwaters (including tributaries) not otherwise designated Char.		X	
Asotin River, North Fork, and all tributaries above Lick Creek, except those waters in or above the Umatilla National Forest	X		
Asotin River, North Fork, and all tributaries above Lick Creek that are in or above the Umatilla National Forest.	X		

Charley Creek and the unnamed tributary at latitude 46.2851 longitude -117.3216: All waters (including tributaries) above the junction, except those waters in or above the Umatilla National Forest.	X		
Charley Creek and the unnamed tributary at latitude 46.2851 longitude -117.3216: All waters (including tributaries) above the junction that are in or above the Umatilla National Forest.	X		
George Creek, above and including Coombs Canyon (including tributaries)	X		
George Creek and the unnamed tributary at latitude 46.2292 longitude -117.1874 (Section 29 T9N R45E), all waters above junction not otherwise designated Char.		X	X
All other waters[1]			X

[1]Waterbodies not included in Table 602 of the water quality standards.

In some waters, special considerations have been included because they are necessary to protect spawning and incubation of char and salmonid species. Supplemental spawning/incubation criteria have been established for specified time periods to protect these special uses. Based on the beneficial uses, a numeric temperature criteria standard is established.

The map below shows where the beneficial and supplemental spawning/incubation uses appear in the Asotin Creek watershed as well as the numeric criteria for temperature for each beneficial use. If the data collected from the creek does not meet the numeric criteria below, the stream is considered impaired and appears as a category 5 water body in the state Water Quality Assessment. Criteria for water temperature are specified as the 7-day average of the daily maximum temperatures (7-DADMax).



Controls that will achieve water quality standards

Asotin Creek is a relatively small stream. The bankfull width of the Asotin mainstem is approximately 13 meters (37 feet). The bankfull widths of lower reaches of the North Fork Asotin Creek, the South Fork Asotin Creek, and George Creek vary, but are generally half that width (Stuart, 2012). As would be expected, stream width diminishes significantly in the upper portions of the watershed. Buffer widths must be adequate to shade the stream and protect against other factors influencing temperature.

In order to meet water quality standards, Ecology will work with partners to create ***75 foot wide well-vegetated buffers on both sides of the stream (150 feet total)*** within the Asotin watershed for all areas used for livestock feeding, livestock grazing, and crop production. Ecology will focus on perennial reaches where stream flow occurs during the critical temperature period (late spring – early fall). Areas of the upper watershed where

streams are intermittent or ephemeral are important for other water quality parameters but will be a lower priority. They will be planted and/or fenced as additional funding allows.

Ecology will implement an additional set of BMPs for properties with livestock. These BMPs use the construction specifications of the Natural Resource Conservation Service Field Office Technical Guide (FOTG). They are:

Livestock Exclusion Fence—A constructed barrier to animals that protects the riparian buffer. The fencing materials and the type and design of fence installed shall be of a high quality and durability. The type and design of fence installed must meet the management objective of excluding cattle from the riparian area. (FOTG Practice Code 382)

Watering Facility—A device to provide an adequate amount and quality of drinking water for livestock. Stock tanks should be installed as far from surface water as possible to protect against contamination of surface water via run-off or ground water connections. (FOTG Practice Code 361)

Stream Crossing—A stabilized area or structure constructed across a stream to provide a travel way for livestock. Stream crossings should be located in areas where the streambed is stable or where grade control can be provided to create a stable condition. (FOTG Practice Code 578)

For forest lands, the Washington State Forest Practices Rules (WAC 222-30) were developed with the expectation that the stream buffers and harvest management prescriptions were stringent enough to meet state water quality standards for temperature. These rules apply to all timber harvest on private lands within Washington. The program has some deficiencies, but provides a framework for bringing the forest practices rules and activities into full compliance with the water quality standards. Some additional discussions with the Department of Natural Resources (DNR) will occur to ensure water quality in Asotin Creek is adequately protected.

Currently, a no-cut buffer is required for fish bearing streams by the Forest Practices Rules. The rules establish a core zone of 30 feet from the stream where no harvest or construction is allowed. An additional 45 foot zone is also protected and no harvest is allowed except when:

- The basal area in the inner zone is greater than 110 square feet per acre and greater than 6 inches diameter. The harvest must leave at least 50 trees per acre including trees that shade the water.
- Thinning, and there are more than 100 trees per acre and the basal area is less than 60 square feet per acre. Still, 100 of the largest trees per acre must be left, including those that shade the stream.

Within the Umatilla National Forest, the Forest Service requires protected areas of 150 or 300 feet for perennial streams depending on the presence or absence of fish, but with exceptions. In addition, they require at least a 50 foot no-cut zone for non-fish-bearing intermittent streams. Some areas in the Umatilla National Forest will require additional

planting based on historic harvest practices or natural events. Ecology will work with the Umatilla National Forest to ensure at least 75 feet of protection is required on all fish-bearing streams. In addition, some forest areas are subject to seasonal grazing. In these areas, a minimum of 35 feet of riparian corridor will be fenced to protect understory vegetation and prevent polluted run-off.

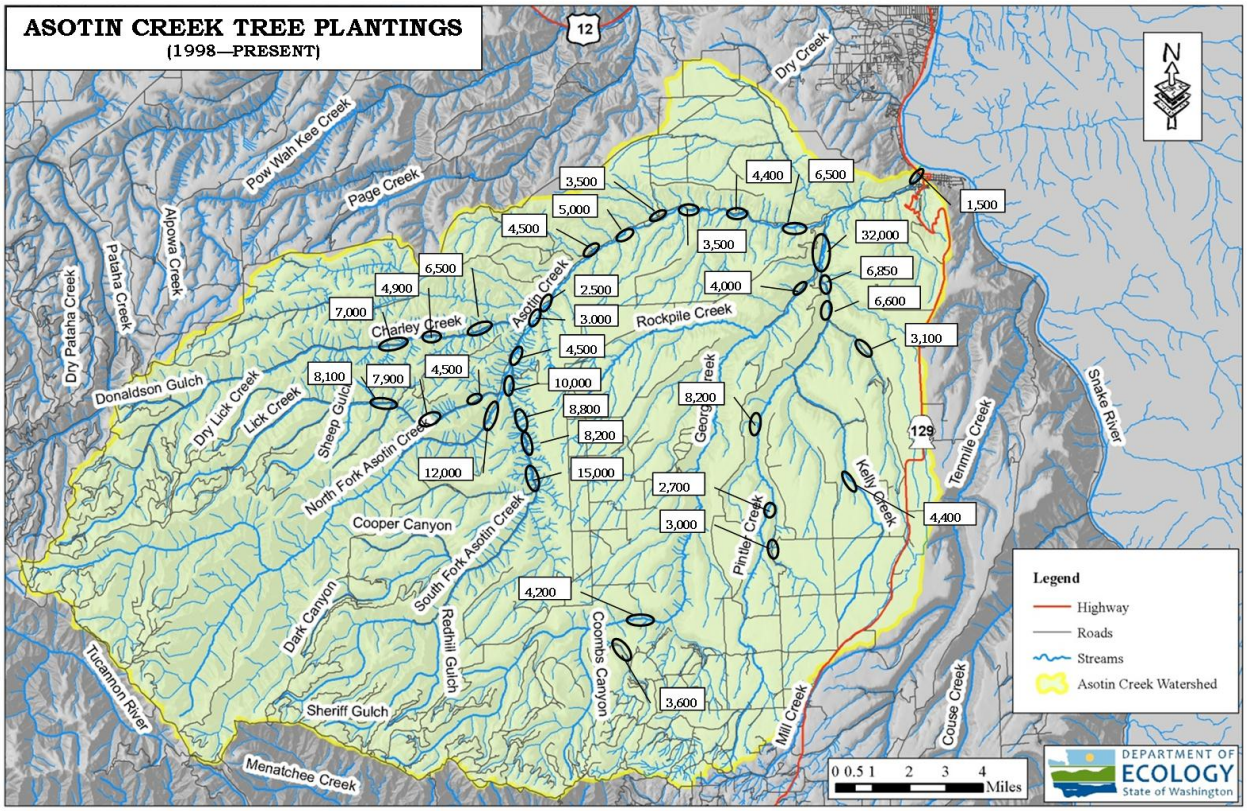
In the urbanized portion of the watershed, there are small areas 75-f00t vegetated buffers are not practical. This exception occurs primarily in lower Asotin Creek. Major roads or home locations do not allow for wider buffers. In these locations, Ecology will work to create 35 foot minimum vegetated buffers. Small buffers will be installed in a very small portion of the watershed (less than 2%) and should not affect the ability to meet water quality standards.

Estimate or Projection of Time When Water Quality Standards Will be Met

Ecology estimates that temperature standards will be met throughout the watershed by 2025.

Schedule for Implementing Pollution Controls

A significant amount of riparian planting has been completed in the Asotin watershed. Since 1998, more than 200,000 trees and shrubs have been planted, although more implementation is needed to achieve compliance with Washington's temperature standards.



Best management practice (BMP) implementation can be broken into two broad categories, riparian protection fencing and riparian planting. When fencing is installed to protect the riparian area from livestock, associated BMP, such as off-stream watering and stream crossings may also be necessary. In many cases, stream reaches will need both kinds of implementation. There are also stream reaches in the watershed where no livestock are present but additional planting is needed to adequately shade the stream.

Riparian Protection Fencing: It is estimated that an additional 60,000 linear feet of riparian protection fencing will be needed in the Asotin Watershed to adequately protect the stream corridor.

Riparian Protection: Schedule for 60,000 linear feet of addition riparian protection.

YEAR #	CALENDAR YEAR	RIPARIAN FENCING (FEET)
1	2015	10,000
2	2016	10,000
3	2017	10,000
4	2018	10,000
5	2019	10,000
6	2020	5,000
7	2021	5,000

Riparian Planting: It is estimated that an additional 84,000 trees and shrubs must be planted to meet water quality standards in the watershed. The objective will be to plant approximately 75% of trees and shrubs on private lands and 25% on public lands.

Riparian Planting: Schedule for 84,000 native trees and shrubs

YEAR #	CALENDAR YEAR	RIPARIAN PLANTING (# OF TREES & SHRUBS)
1	2015	12,000
2	2016	12,000
3	2017	12,000
4	2018	12,000
5	2019	12,000
6	2020	12,000
7	2021	12,000

Monitoring Plan to Track effectiveness of Pollution Controls

Ecology's Eastern Regional Office will partner with the Asotin County Conservation District to perform continuous temperature monitoring at a minimum of the eight of the category 4b segments. Monitoring activities are likely to be funded by a combination of Centennial Clean Water Funds and Ecology monitoring funds. Monitoring may also be funded, in part, by other agencies such as the Washington State Department of Fish and Wildlife.

It takes time to implement riparian fencing and planting projects and time for planted vegetation to grow. Therefore, it is not necessary to monitor every year. At the same time, it is important to monitor frequently to capture water quality improvements over time as well as account for the annual variability that can result from different weather patterns. Ecology will use a two-year-on and two-year-off monitoring schedule to evaluate the effectiveness of this plan.

Commitment to Revise Pollution Controls as Necessary

Ecology will maintain a presence in the Asotin Creek watershed to ensure that water quality continues to improve. We fully expect the BMPs being implemented will achieve compliance with water quality standards. However, if they do not, Ecology will work with its local partners to determine other controls that could be used to achieve compliance.